



A NEW *SCINAX* WAGLER, 1830 OF THE *S. ROSTRATUS* GROUP FROM CENTRAL BRAZIL (AMPHIBIA, ANURA, HYLIDAE) ¹

(With 8 figures)

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ABSTRACT: A new species of the genus *Scinax* belonging to the *S. rostratus* species group is described from the State of Goiás, Brazil. *Scinax constrictus* sp.nov. is characterized by small snout-vent length (males ranging 20.8-29.4mm; females 28.2-35.6mm), protuberant nostrils, vocal sac pigmented, superior eyelid, calcar, and jaw tubercles present, dermal constriction on the shoulders in adults, two separate tubercles above the cloaca in females, and a discrete anal flap in males; an open land, non-forest species. A description of the advertisement call is provided.

Key words: Amphibia, Anura, Hylidae, *Scinax constrictus* sp.nov., taxonomy.

RESUMO: Nova espécie de *Scinax* Wagler, 1830 do grupo de *S. rostratus* do Brasil Central (Amphibia, Anura, Hylidae).

Uma nova espécie do gênero *Scinax* pertencente ao grupo de *S. rostratus* é descrita do Estado de Goiás, Brasil. *Scinax constrictus* sp.nov. caracteriza-se por apresentar pequeno comprimento rostro-anal (machos 20,8-29,4mm; fêmeas 28,2-35,6mm), narinas protuberantes, saco vocal pigmentado, presença de tubérculos na pálpebra superior, calcâneo e na mandíbula, constricção dérmica sobre os ombros dos adultos, dois tubérculos separados acima da cloaca nas fêmeas e um discreto *flap* anal nos machos; espécie de área aberta. O canto de anúncio é descrito.

Palavras-chave: Amphibia, Anura, Hylidae, *Scinax constrictus* sp.nov., taxonomia.

INTRODUCTION

Scinax Wagler, 1830 is one of the most diversified genus among the neotropical hylid frogs, including 85 species (CARAMASCHI, 2004; FROST, 2002). POMBAL & GORDO (1991) recognized the priority of *Scinax* in relation to *Ololygon* Fitzinger, 1843, and DUELLMAN & WIENS (1992) diagnosed the genus based on external morphology, osteology, and larval/reproductive features, defining several species groups. Among them, the *S. rostratus* group is defined by characteristics as the presence of an acuminate snout, pointed tubercle on heel, and head-down calling position (DUELLMAN, 1972; FAIVOVICH, 2002). Currently, nine species are recognized in this group (FROST, 2002): *S. boulengeri* (Cope, 1887), *S. garbei* (Miranda-Ribeiro, 1926), *S. jolyi* Lescure & Martin, 2001, *S. kennedyi* (Pyburn, 1973), *S. nebulosus* (Spix, 1824), *S. pedromedinae* (Henle, 1991), *S. proboscideus*

(Brongersma, 1933), *S. rostratus* (Peters, 1863), and *S. sugillatus* (Duellman, 1973). Herein, we describe a new species of the *S. rostratus* group from the Brazilian Cerrado biome.

MATERIAL AND METHODS

Specimens used in the description or examined for comparisons are deposited in MNRJ (Museu Nacional, Rio de Janeiro, Brazil), ZUEC (Museu de História Natural, Universidade Estadual de Campinas, Brazil), and ZUFG (Universidade Federal de Goiás, Brazil).

The following measurements were taken to the nearest 0.01mm with calipers: SVL (snout-vent length), HW (head width), HL (head length), THL (thigh length), TBL (tibia length), and FL (foot length). Six others variables, ED (eye diameter), IOD (interorbital distance), IND (internarial distance),

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END (eye-nostril distance), NSD (nostril-snout distance), and TD (tympanum diameter), were measured using an ocular micrometer in a Zeiss stereomicroscope. All measurements are in millimeters and followed DUELLMAN (2001) and CEI (1980). Webbing formula notation was described following SAVAGE & HEYER (1967), as modified by MYERS & DUELLMAN (1982).

Advertisement calls of six males were recorded with a DAT Sony TCD-D100 or DAT Tascam recorder and microphone ECM-MS 907 or Sennheiser ME66, respectively. The vocalizations were edited at a sampling frequency of 12kHz and 16 bits resolution with a PC-Pentium computer, and analyzed with Avisoft-Sonagraph Light and Cool Edit 96 softwares. The sonogram was produced with 256 points, overlap of 87.5%, and in flat top.

RESULTS

Scinax constrictus sp.nov. (Figs.1-8)

Holotype – BRAZIL - GOIÁS: Municipality of Palmeiras (16°48'S; 49°55'W), Sítio dos Pinheiros, MNRJ 31205, adult ♂, L.P.Lima col., 26/II/2001.

Paratopotypes – MNRJ 31206-31225, 19 adult ♂ and one adult ♀, L.P.Lima col., 26/II/2000; ZUFG 883-886, four adult ♂, L.P.Lima col., 12/II/2000;

ZUFG 942-943, two adult ♂, L.P.Lima col., 24/III/2002; ZUFG 958, adult ♂, L.P.Lima col., 13/II/2000; ZUFG 961-962, two adult ♂, L.P.Lima col., 04/XI/2000; ZUFG 979, adult ♂, L.P.Lima col., 30/X/2000; ZUFG 980-981, two adult ♂, L.P.Lima col., 13/X/2000; ZUFG 992-995, four adult ♂, L.P.Lima col., 24/III/2001; ZUFG 1008-1012, 1014-1022, 13 adult ♂ and one adult ♀, collected with the holotype; ZUFG 1665 (Fig.1), adult ♂, L.P.Lima, R.C.D.Pinheiro e R.P.Bastos cols., 07/II/2003.

Referred specimens – BRAZIL - GOIÁS: Municipality of Guapó: ZUFG 947-948, two adult ♂, R.F.Juliano col., 24/III/2000. Municipality of Itaberaí: ZUFG 1300-1303, four adult ♂, R.P.Bastos, L.P.Lima e D.Brandão cols., 12/I/2001. Municipality of Jussara: ZUFG 1192, adult ♂, R.P.Bastos, L.P.Lima e D.Brandão cols., 13/I/2001. Municipality of Mossamedes: ZUFG 821-822, 845, two adult ♂ and one adult ♀, Fazenda Água Fria, R.P.Bastos e R.F.Juliano cols., 23/I/2000. Municipality of Pirenópolis: ZUEC 10273-10276, 10277-10285, 11 adult ♂ and two adult ♀, A.J.Cardoso, A.S.Rand e A.A.Giaretta cols., 04/XII/1992. Municipality of Pontalina: MNRJ 31226-31227, adult ♂ and adult ♀, Fazenda Lagoa Grande, L.D.Guimarães, C.F.B.Haddad, J.P.Pombal Jr. and R.P.Bastos cols., 16/XII/1998; ZUFG 288-289, two adult ♂, L.D.Guimarães e R.P.Bastos cols., 17/III/1997;



Fig.1- *Scinax constrictus* sp.nov., paratopotype (ZUFG 1665), adult male in life.

ZUFG 515- 522, eight adult ♂, L.D.Guimarães e R.P.Bastos cols., 26/X/1998. Municipality of Porangatu: ZUFG 1402, adult ♂, Leôncio P.Lima e Leopoldo P.Lima cols., 21/XII/2000. Municipality of Uirapuru: ZUFG 702, adult ♂, M.B.Alcantara col., 01/IV/1999.

Diagnosis – A small species (Figs.2-3) of the *Scinax rostratus* group; SVL of males 20.8-28.4mm, females 28.2-35.6mm; protuberant nostril; vocal sac pigmented; upper eyelid, calcar, and jaw tubercles present; nostrils not projected from head contour in dorsal view; a dorsolateral dermal constriction on the shoulders in adults; two separate tubercles above the cloaca in females and a discrete anal flap in males; an open area inhabitant species.

Comparisons with others species – *Scinax constrictus* sp.nov. most resembles *S. nebulosus* (characters in parentheses) in general aspect, but it can be distinguished generally by the smaller SVL ($\bar{x}$ = 26.1mm, range=24-30mm in males; $\bar{x}$ = 38.0mm, range= 35-40mm in females; LUTZ, 1968, DUELLMAN, 1972); presence of discrete anal flap in males (no anal flap; LUTZ, 1968); presence of one row of small tubercles on the edge of lower jaw (absent or indistinct row; LUTZ, 1968, DUELLMAN, 1972); advertisement call with higher or lower dominant frequency ($\bar{x}$ = 2867.3Hz, range=2685.6-3129.8Hz according to DE LA RIVA, MÁRQUEZ & BOSCH, 1994; $\bar{x}$ = 4500Hz, range=4200-4800Hz according to

HÖDL, 1977), generally lower call duration ($\bar{x}$ = 277ms, range=190-385ms according to HÖDL, 1977, or $\bar{x}$ = 240.6ms, range=201.1-305ms according to DE LA RIVA, MÁRQUEZ & BOSCH, 1994), and higher note number (4-7 notes according to DUELLMAN, 1972, or one note by call according to DE LA RIVA, MÁRQUEZ & BOSCH, 1994).

Scinax constrictus sp.nov. differs from *S. boulengeri* (characters in parentheses) by the smaller SVL ($\bar{x}$ = 41.1mm, range=35.5-48.7mm in males; SVL maximum=53mm in females; LEÓN, 1969; DUELLMAN, 1972); presence of discrete anal flap in males (no anal flap; DUELLMAN, 1972), posterior surface of legs brown or pale green (greenish yellow or orange; DUELLMAN, 1972); advertisement call with lower dominant frequency ($\bar{x}$ = 2840Hz, range=2520-3182Hz; LEÓN, 1969), lower call duration ($\bar{x}$ = 350ms, range=240-470ms; LEÓN, 1969), and higher note number (one note; LEÓN, 1969).

From *S. garbei* (characters in parentheses), *S. constrictus* sp.nov. differs by the smaller SVL (range=30-42mm in males, range=38-48mm in females; RODRIGUEZ & DUELLMAN, 1994); posterior surface of legs brown or pale green (yellow or orange; DUELLMAN, 1972); advertisement call with higher note number (one note; DUELLMAN, 1970) and lower duration ($\bar{x}$ = 690ms, range=230-1860ms; DUELLMAN, 1970).



Scinax constrictus sp.nov., holotype (MNRJ 31205): fig.2- dorsal view, fig.3- ventral view.

Scinax constrictus sp.nov. can be distinguished from *S. jolyi* (characters in parentheses; LESCURE & MARTY, 2001) by the smaller SVL ($\bar{x}$ = 37.7mm, range = 36.5-39.1 in males; $\bar{x}$ = 41.85mm, range = 40.0-43.7mm in females); presence of one row of small tubercles on the edge of lower jaw (no row); advertisement call with only pulsioned structure (advertisement call with harmonic and pulsioned structure).

Scinax constrictus sp.nov. differs from *S. kennedyi* (characters in parentheses; PYBURN, 1973) by the smaller SVL ($\bar{x}$ = 33.0mm, range = 31.5-35.3 in males; SVL of one female = 37.3mm); presence of one row of small tubercles on the edge of lower jaw (no row); posterior surface of legs brown or pale green (orange); advertisement call with lower duration ($\bar{x}$ = 1770ms, range = 690-2100ms) and higher dominant frequency ($\bar{x}$ = 1200Hz, range = 1050-1600Hz).

From *S. pedromedinae* (characters in parentheses), *S. constrictus* sp.nov. differs by, generally, the smaller SVL ($\bar{x}$ = 26.4mm, range = 22.2-28.9mm in males; $\bar{x}$ = 29.4mm, range = 27.5-31.5mm in females; DUELLMAN & WIENS, 1993); jaw tubercles less evident (line of tubercles evident; DUELLMAN & WIENS, 1993); open land species (primary rainforest species; HENLE, 1991); advertisement call with higher duration (90-100ms; DUELLMAN & WIENS, 1993).

Scinax constrictus sp.nov. differs from *S. proboscideus* (characters in parentheses; DUELLMAN, 2001) by the smaller SVL ($\bar{x}$ = 37.4mm, range = 33.0-39.8mm in males; SVL = 37.0mm in one female); absence of a fleshy proboscis (presence); concealed parts of the legs brown or pale green (yellow); advertisement call with higher note number ($\bar{x}$ = 1.3, range = 1-3) and higher dominant frequency ($\bar{x}$ = 2012Hz).

Scinax constrictus sp.nov. can be distinguished from *S. rostratus* (characters in parentheses; DUELLMAN, 2001) by the smaller SVL ($\bar{x}$ = 45.7mm in males; $\bar{x}$ = 48.0mm in females); presence of a line of tubercles on lower jaw (no line); presence of tubercle on hell (no tubercle); concealed parts of the legs brown or pale green (orange or dark yellow); advertisement call with higher dominant frequency ($\bar{x}$ = 920Hz) and lower duration ($\bar{x}$ = 690, range = 230-860ms).

Scinax constrictus sp.nov. differs from *S. sugillatus* (characters in parentheses; DUELLMAN, 1973) by the smaller SVL ($\bar{x}$ = 39.9mm, range = 38.7-42.0mm in males; SVL of one female = 45.5mm in); jaw tubercles less evident (line more evident); higher

note number (1-2 notes); advertisement call with higher dominant frequency ($\bar{x}$ = 2023Hz, range = 1017-2904Hz), and lower duration ($\bar{x}$ = 390, range = 280-600ms).

Description of the holotype – Head 12.5% longer than wide; snout elongate, pointed in dorsal view (Fig. 4) and acute in lateral view (Fig. 5); nostrils not projected from head contour in dorsal view, projected in lateral view; canthus rostralis distinct; tympanum evident, circular; supratympanic fold evident with enlarged tubercles; lower eyelid bordered by a tinny white stripe; tongue slightly cordiform, free behind; vomerine teeth in two small groups between choanae; single subgular vocal sac; five tubercles along the edge of the lower jaw; upper arm strong, with 2-4 tubercles on outer side; fingers size I < II ~ IV < III (Fig. 6); fingers I and II free, II and III, and III and IV linked at base by web; nuptial pads present but poorly developed; outer metacarpal tubercle cordiform, inner metacarpal tubercle oval; subarticular tubercles rounded; finger disks wider than long; toes size I < II < V ~ III < IV (Fig. 7); foot webbing formula I 2 2/3-2 II 1-2 III 1-2 IV 2-1 V; inner metatarsal tubercle rounded, the outer with half size of the inner; subarticular tubercles rounded; supernumerary tubercles discrete on hands and feet; outer margin of tarsus and foot with a ridge of tubercles; calcar tubercle prominent; a discrete anal flap formed by two enlarged tubercles; a dermal groove from the cloaca to venter of thighs; dorsum and head smooth with many enlarged tubercles; loreal and shoulder regions more tuberculate; body constricted at the level of shoulders; dorsal surfaces of arms and legs with scattered tubercles; venter granular; ventral surfaces of legs and arms smooth.

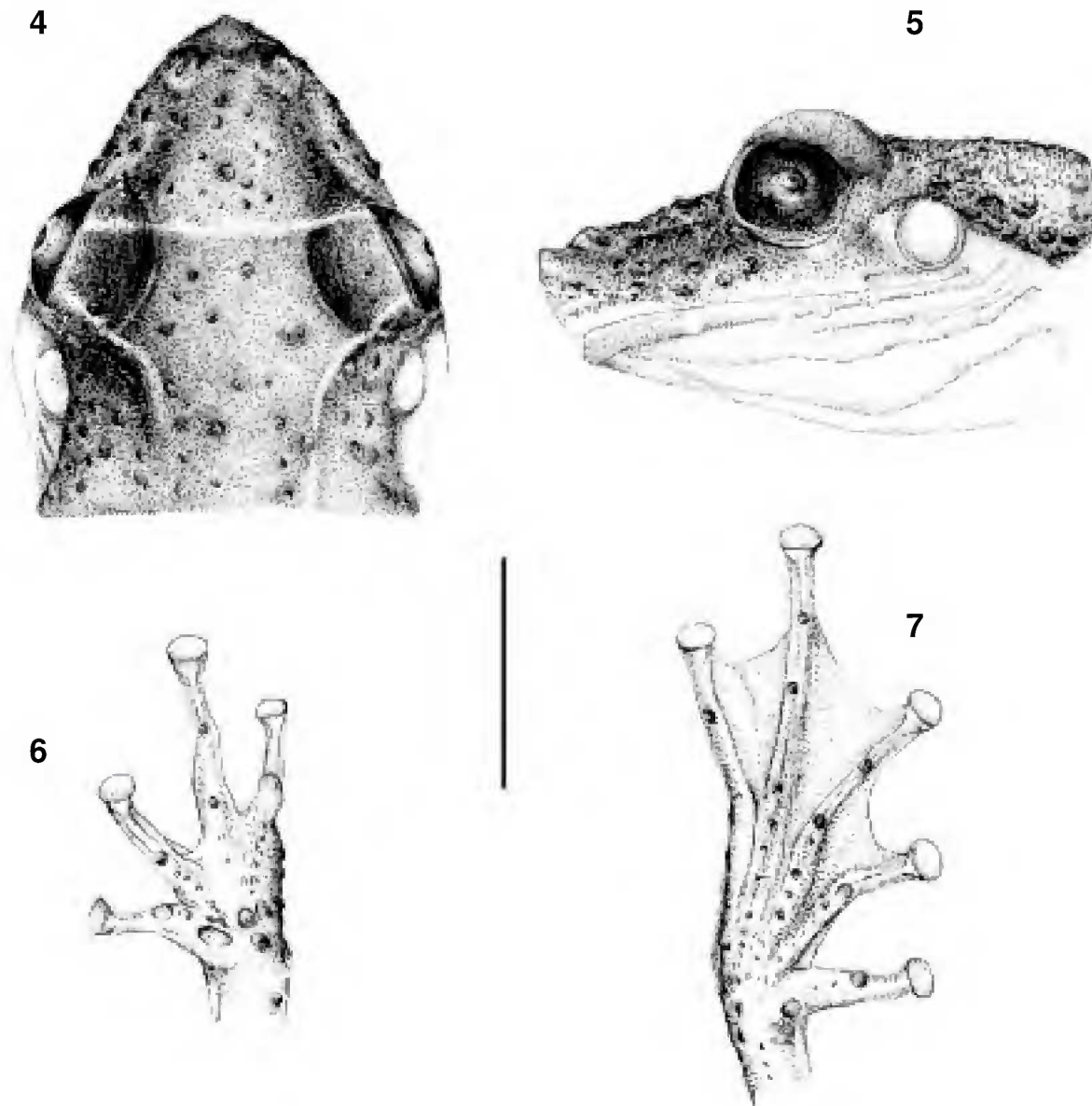
Color in life – Males and females showed dorsum color ranging from beige or pale green to brown or dark brown, with black irregular spots. Granules of dorsum brown, yellow or orange. Tympanum bronze. A triangular spot with apex directed posteriorly, bordered by a yellow line, between the eyes. Upper surfaces of arms and legs brown with irregular stripes dark brown. Concealed parts of the legs brown or pale green. Belly white to light brown. Throat whitish with brown flecks. Iris pale to dull bronze with black median vertical streak.

Color in preservative (70% alcohol) – Color similar to those in life, however more dark. The colors yellow or orange of the dorsal granules, yellow of tympanum, and yellow of line around the spot between the eyes become opaque and brown.

Measurements of holotype – SVL 24.2; HL 8.2; HW 7.2; ED 2.5; TD 1.3; IOD 2.5; END 2.5; NSD 1.0; IND 1.7; THL 12.2; TBL 13.9; FL 10.5.

Variation – About 82% of specimens (males and females) have the triangular spot between eyes. Skin on dorsum varied from slightly tuberculate to tuberculate. The dorsum may be brown or dark brown. Most of the specimens (87%) showed limbs with three dark brown transverse bars. Nuptial pads present in 95% of the adult males. Mean, standard deviation, and range of measurements of 82 males and six females are presented in table 1.

Advertisement call – The call showed pulsioned structure (Fig.8). Average call duration 213.4 ± 24.0 ms (range=180.2-242.2 ms; n=30 calls of five males); 9.3 ± 0.9 notes (range=6.0-10.0 notes; n=30 calls), each with average duration of 17.08 ± 2.01 ms (range=14.5-20.4 ms; n=150 notes); notes given at intervals of 6.9 ± 0.7 ms (range=6.0-8.0 ms; n=30 calls). Each note is constituted, in average, by 7.0 ± 2.0 pulses (range=4.0-9.0 pulses; n=150 notes) with average duration of 2.4 ± 0.4 ms (range=2.0-4.0 ms; n=150 pulses). Repetition call rate was 18.0 ± 3.5 calls/min (range=14.0-23.0 calls/min, n=5 males); average dominant frequency



Scinax constrictus sp.nov., holotype (MNRJ 31205): fig.4- dorsal view of head, fig.5- lateral view of head, fig.6- ventral view of hand, fig.7- ventral view of foot. Scale bar = 5mm.

was 3292.1 ± 123.2 Hz (range=3115.2-3487.6 Hz; n=30 calls of five males).

Habitat and natural history – The reproductive activity was observed between December and March in permanent ponds localized in open areas. Generally, the males vocalized with head down, on the branches of the marginal arbustive vegetation. The average height of the site of vocalization was 79.2 ± 13.5 cm (range=38.0-112.2 cm; n=46). Gravid females were collected in December, January, and February. The spawning had 207 black eggs (n=1 clutch), with a diameter of 1.3 ± 0.13 mm (n=10 eggs). Tadpoles are unknown.

Distribution – The new species is known from the municipalities of Guapó, Itaberaí, Jussara, Mossamedes, Palmeiras, Pirenópolis, Pontalina, Porangatu, and Uirapuru, in the State of Goiás, Brazil.

Etymology – The specific epithet *constrictus* comes from the Latin word *constrictio*; it is used here in reference to the presence of a dorsolateral dermal constriction on the shoulders of the new species.

Remarks – *Scinax constrictus* sp.nov. has the southernmost distribution of the species of the *S. rostratus* group, being the first species cited for the Cerrado biome. As mentioned in the comparison with other species, in spite of the resemblance of *S. constrictus* sp.nov. with *S. nebulosus*, its possible to separate these two species by morphology and advertisement call characteristics. The advertisement call of the new species is quite different in relation to the

dominant frequency and note number, despite the great variation of the call characteristics of *S. nebulosus* (DUELLMAN, 1970; HÖDL, 1977; DUELLMAN & PYLES, 1983; DE LA RIVA, MÁRQUEZ & BOSCH, 1994). As example, the dominant frequency in *S. nebulosus* changed from 2867.3 to 4800 Hz, in spite of male SVL of different populations which is similar. So, this discrepancy could be indicative that different taxa are being considered as *S. nebulosus*. A carefull evaluation of the taxonomics status of *S. nebulosus* along its geographical distribution would be necessary.

SPECIMENS EXAMINED

Scinax garbei – BRAZIL - ACRE: Municipality of Cruzeiro do Sul: (ZUEC 4396, 5389-5390, 10640), Humaitá do Moa (ZUEC 5433), Miritizal (ZUEC 9505), Vila Militar (ZUEC 4603, 4654-4655, 4667-4671, 4710-4715). Municipality of Mâncio Lima: Colônia São Francisco (ZUEC 4370-4371, 4636-4639). Municipality of Rio Branco: Parque Zoobotânico da UFAC (ZUEC 5577-5578, ZUEC 7125). Municipality of Xapuri: Caminho da Boa Vista (ZUEC 5706-5707).

Scinax nebulosus – BRAZIL - PARÁ: Municipality of Altamira: camping Juruá da CNEC Km 10 (ZUEC 7240), camping Juruá da CNEC Km 26 (ZUEC 7253-7254); camping Kararaho da CNEC (ZUEC 7331), Mr. Oswaldo's small farm, surroundings of the camping Meu Sossego (ZUEC 7395).

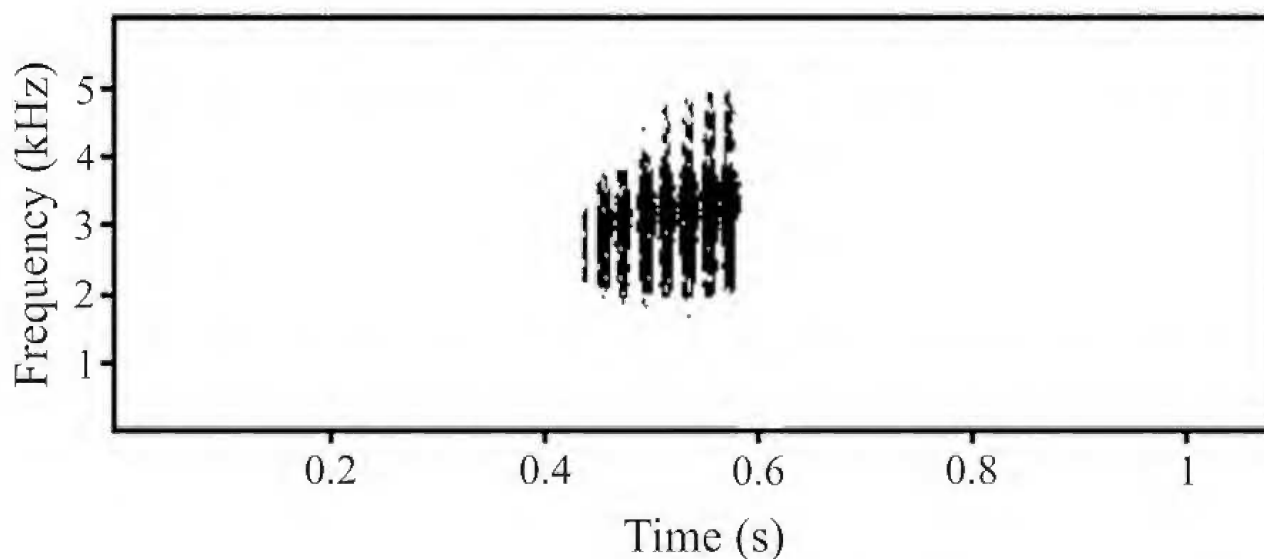


Fig.8- *Scinax constrictus* sp.nov., sonogram of advertisement call (MNRJ 31205; air temperature 24.1°C).

TABLE 1. Mean ($\bar{x}$), standard deviation (s), and range of the measurements (mm) of males and females of *Scinax constrictus* sp.nov.

	σ (n = 82)			φ (n = 6)		
	$\bar{x}$	s	Range	$\bar{x}$	s	Range
SVL	26.09	1.83	20.8-28.4	31.93	2.53	28.2-35.6
HL	8.97	0.81	7.2-10.7	12.09	1.36	10.3-13.7
HW	7.97	0.59	6.6-9.1	10.67	0.81	9.4-11.7
ED	3.56	0.52	2.4-4.4	4.1	0.34	3.7-4.3
TD	1.31	0.52	2.4-4.4	1.9	0.39	1.3-2.2
IOD	3.03	0.29	2.4-3.7	3.67	0.24	3.3-3.8
IND	2.41	0.19	1.5-2.7	2.67	0.38	2.2-3.1
END	3.13	0.32	2.4-3.8	3.65	0.33	3.3-4.1
NSD	1.78	0.21	1.0-2.1	2.39	0.47	1.8-2.3
THL	12.56	0.87	10.4-14.4	18.96	1.08	15-17.3
TBL	14.14	1.11	11.2-17.0	17.64	1.23	1.66-19.6
FL	11.33	0.96	7.9-13.0	14.71	0.99	13.7-15.7

(n) number of specimens.

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